DOCUMENT RESUME

ED 446 222 CE 080 811

AUTHOR Falk, Ian; Kilpatrick, Sue
TITLE Numeracy, Literacy, Self-Confidence and Values: Chickens, Eggs and "Access." CRLRA Discussion Paper Series.
INSTITUTION Tasmania Univ., Launceston (Australia). Center for Research and Learning in Regional Australia.
SPONS AGENCY Australian National Training Authority, Melbourne.
REPORT NO CRLRA-D1/1998
ISSN ISSN-1440-480X
PUB DATE 1998-09-00
NOTE 23p.; For related documents in the CRLRA Discussion Paper Series, see CE 080 809-818.
AVAILABLE FROM Centre for Research and Learning in Regional Australia, P.O. Box 1214, Launceston, Tasmania 7250, Australia, Tel: 03 6324 3142, Fax: 03 6324 3040, E-mail: Lamanda.Harris@utas.edu.au, Web site: http://www.crlra.utas.edu.au ($3 Australian).
PUB TYPE Reports - Research (143)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adult Basic Education; Agricultural Education; *Animal Husbandry; *Continuing Education; Developed Nations; Farm Management; Foreign Countries; *Literacy Education; *Numeracy; *Quality Control; Regional Characteristics; Self Esteem; *Values
IDENTIFIERS *Australia; Beef Cattle Production

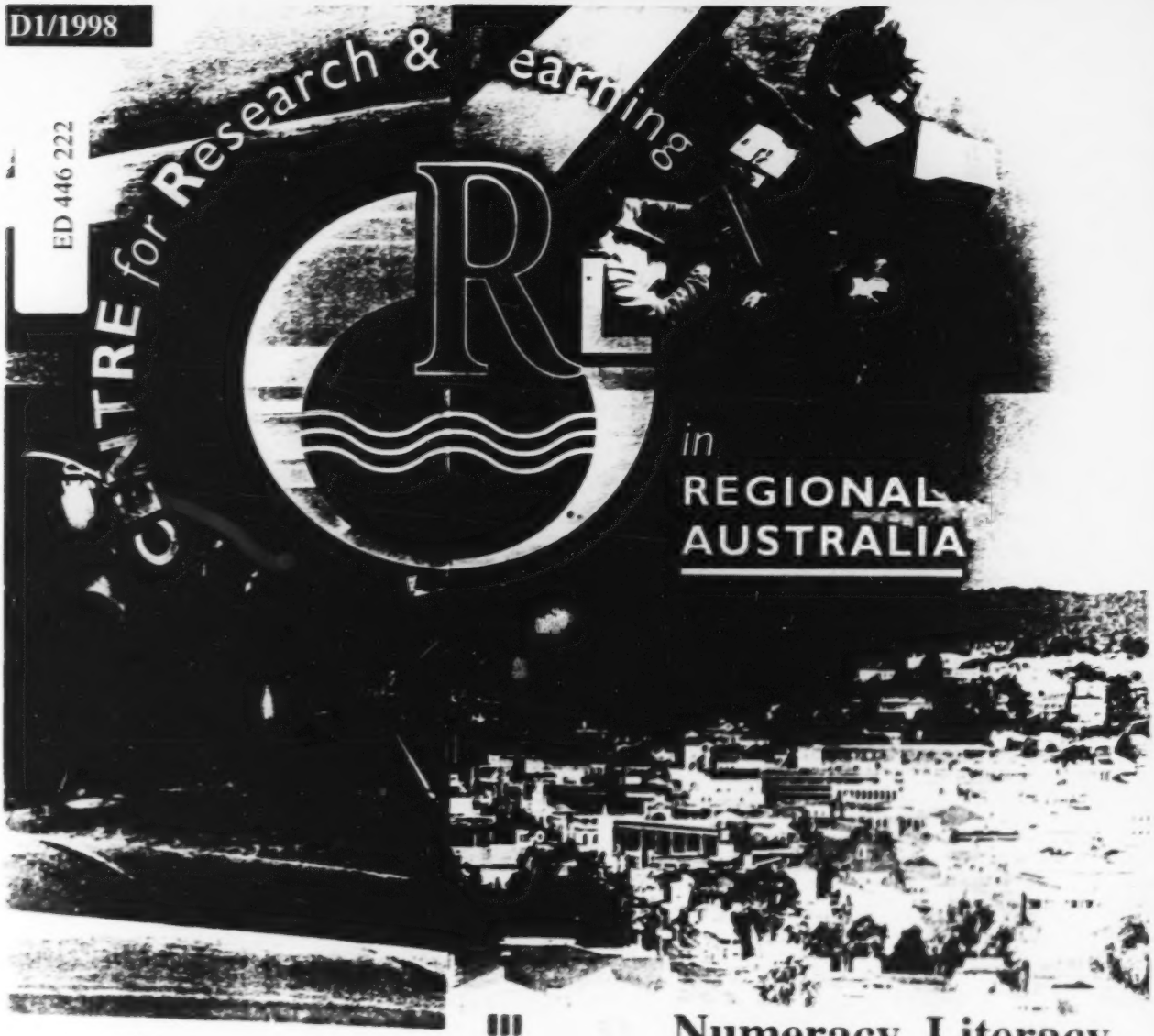
ABSTRACT

A project explored the complex relationships between "integrated" numeracy and literacy skills, self confidence, and the place of skills, knowledge, and values in the learning process. The focus was on beef producers undertaking training in quality assurance (QA). Analysis of observations of QA process on three case study farms and examination of Cattlecare (the QA program developed for the beef industry) manuals suggested skills required to access QA. Findings indicated the following: (1) numeracy skills required for the non-chemical handling parts of Cattlecare were mostly arithmetic; (2) chemical mixing and administration involved more complex tasks; (3) Cattlecare manuals had a higher readability index than farming and popular newspapers and magazines; and (4) many Cattlecare forms were at the more complex end of the structure spectrum. The knowledge required to access QA was identified. These two possible reasons were suggested for failure to proceed with QA: the relatively high level of literacy and numeracy skills required and the high cost of necessary changes and accreditation. Underpinning the whole question of access was that farmers had to first value learning as important. Numerical and literacy activities were not prerequisites for learning about QA. Development of self confidence was shown in the values stage of learning. (Contains 25 references.) (YLB)

Reproductions supplied by EDRS are the best that can be made
from the original document.

D1/1998

ED 446 222



Numeracy, Literacy, Self-confidence and Values: Chickens, eggs and 'access'

Ian Falk & Sue Kilpatrick

Discussion Paper D1/1998

BEST COPY AVAILABLE

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
S. Kilpatrick
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

CE 020 811

CRLRA Discussion Paper Series
ISSN 1440-480X

Australian National Training Authority

NUMERACY, LITERACY, SELF-CONFIDENCE AND VALUES: CHICKENS, EGGS AND "ACCESS"

Ian Falk & Sue Kilpatrick

Centre for Research and Learning in Regional Australia
Faculty of Education
University of Tasmania
PO Box 1214
Launceston, Tasmania 7250
Australia
Phone: (03) 6324 3713
Fax: (03) 6324 3040
E-mail: Ian.Falk@utas.edu.au
http://www.crlra.utas.edu.au

Abstract

In this paper we report on some results from a project which sought to uncover the complex relationships between "integrated" numeracy and literacy skills, self-confidence, and the place of skills knowledge and values in the learning process. The case of beef producers undertaking training in Quality Assurance (QA) is examined. Like all industry sectors in the Western world today, these farmers are faced with dramatic changes in their industry. In the near future, all agricultural products will be required to be quality assured or export markets, responsible for over 50% of purchases in the case of beef, and major retailing supermarket chains, responsible for up to 80% of domestic beef purchases (Ashton et al, 1996), will simply not buy the product. Central questions are: How can more farmers become more effective learners? How can their uptake of training, assumed to be a pathway to QA accreditation, be multiplied?

Through the project's crucial mid-point meeting and subsequent analysis of multiple data sources, evidence is presented which sheds light on the nature and role of "self-confidence" in the learning process. The paper further shows how self-confidence relates to the need for suitable numeracy and literacy skills, and comments on the relative importance of self-confidence, numeracy or literacy skills, knowledge and values in the overall learning processes involved in this case of vocational education and training.

Paper D1/1998 in the *CRLRA Discussion Paper Series*

© September 1998

Which comes first: Self-confidence, numeracy or literacy skills, knowledge or values?

This paper presents what is really only a by-product of a larger research project which aims at identifying the role of numeracy and literacy skills in the training and education that beef producers undertake in order to become Quality Assurance accredited.

One by-product of the analyses undertaken is, we believe, to help untangle the issues of self-confidence and integrated numeracy and literacy through a re-examination of skills, knowledge and values in learning and education in agriculture (and by implication, other industry sectors). Hopefully, it will help all of us think more clearly about which comes first: self-confidence, numeracy and literacy skills, knowledge or values; and of these are prerequisites to the entire process of learning.

In order for the reader to follow the discussion about self-confidence, the paper first sets the context of the whole project. Then follows some context on the changing nature of numeracy and literacy requirements in the agricultural sector. The next section discusses the meaning of integrated numeracy and literacy adopted by the project. Explanatory segments on "access" then leads off the discussion about the true nature of access, skills, knowledge and values. The question of readability of the materials involved follows, and the paper finishes with a discussion of the implications and conclusions for the significance of the learners' values orientation and self-confidence in the early phases of learning.

About the larger project

The project is concerned with the identification of integrated numeracy and literacy skills, and the incorporation of these into a set of recommendations for a learning package for access to more formalised training pathways in the beef industry. Through using the beef industry as a case study, it was intended that the project would provide an exemplar for other agricultural (and wider) industry groups nationally. It examines the processes, materials and texts used in Quality Assurance and in existing Quality Assurance self-paced training packages. It analyses the numeracy and literacy skills required to use these materials and match this data with existing data about the target population of farmers obtained from this and existing research. Following the identification of integrated numeracy and literacy skills, the changes required of farmers will be identified, and the various components of the learning process will be integrated into a set of recommendations for training pathways and packages.

Numeracy and literacy in the agricultural sector in Australia

Since most agricultural production is exported, farm businesses are directly exposed to global competitive pressures. The rural sector contributed 29% of Australia's merchandise exports in 1994-95 (Martin, 1996). Agriculture, like all sectors of industry, is operating in a climate of change. Change is occurring in international markets, in domestic markets, in government protection and in

consumer requirements. Change brings with it a need to understand and manipulate new work knowledge and practices, all of which depend on task-oriented up-to-date literacy and numeracy skills. These skills may be unfamiliar to those such as farmers as they increasingly need to engage in formal and nonformal adult learning and training.

Farmers are coming into contact with (a) unfamiliar procedures and practices in their field, and (b) new sources of information and unfamiliar ways of presenting that information. As well, there are new forms of literacy and numeracy information appearing on an daily basis, including technological changes such as the internet and electronic mail. Change brings with it the need to adapt to the new forms of numeracy and literacy which are integrated in the work tasks.

The National Farmers' Federation (1993) stresses the need for training and flexibility in order for the agricultural sector to remain internationally competitive. The National Farmers Federation states that:

> ...the skills required of farmers in the past in order to succeed in agriculture will in future need to be supplemented with additional skills in order to cope with the changes that have emerged over recent decades. (National Farmers Federation, 1993, 75).

Global markets require quality products. Consumers, retailers, wholesalers and food processing companies need assurance that products meet minimum quality standards, for example in terms of chemical residue and disease-free status. The public concern following the recent outbreak of mad cow disease in the United Kingdom emphasises the importance of being able to prove that products meet quality standards.

Quality Assurance procedures and practices, which have evolved at an international level, are essential to Australia's global positioning, yet the present capacity of farmers to understand the entire process and adapt their practices accordingly is not commensurate with the quality implementation scenario. This places even greater strain on individual literacy and numeracy resources to cope with existing and projected change.

The Australian Meat and Livestock Corporation believes that many producers are not able to access Quality Assurance programs because they lack the required numeracy and literacy skills. As well, the Tasmanian Farmers and Graziers Association (TFGA) state that:

> In view of the recognised literacy and numeracy inadequacies of the rural population it is vital that producers have the skills to cope with the requirement that the customer is demanding of them. (Tasmanian Farmers and Graziers Association, Personal correspondence, 1996)

It is therefore essential for both the agricultural sector and the Australian economy that Australia's farmers have an appropriate kinds of skills, including numeracy and literacy, which will enable them to be confident in dealing with changes such as Quality Assurance and marketing.

Integrated numeracy and literacy

In this project, we refer to individuals' numeracy and literacy skills to include their capacity to perform with ease the numeracy and literacy components which are a part of and integrated into the existing and expected work tasks with which they are confronted in their daily lives. The numeracy and literacy skills required are both at a basic level and those required for more complex numeracy and literacy tasks. The project also considered the report of the 1993-1994 Australian Language and Literacy Policy project, undertaken by the Foundation Studies Training Division Of The NSW TAFE Commission, titled "Integrating English Language, Literacy and Numeracy into Vocational Education and Training: A Framework".

The following working definition of integrated numeracy and literacy was decided on (e.g., Freebody et al, 1993; Falk, 1995 & 1997), an definition which brings together definitions such as Queensland Literacy and Numeracy Strategy (1994) and DEET (1991) in the specific context of vocational purposes:

> Numeracy, literacy and language are used for different purposes within a wide variety of differing situations. Vocational settings, or workplaces, form one such group of settings, but each setting contains different, context dependent numeracy, literacy and language competences. The vocational and workplace settings provide the social activities in which language, literacy and numeracy competences are embedded.

The implication of this point for the project is that the term "integrated" numeracy, literacy and language processes and practices refers to the "embeddedness" of the numeracy, literacy and language competence. The nature of the embeddedness determines the nature of the "integration" of numeracy, literacy and language competences in that site, in that context, at that time, with those varying activities which are displayed or required there. Moreover, embedded numeracy and literacy practices are always *about something* (Gee, 1990), and always incorporate values or sets of values (Falk, 1995; Gee, 1990).

Literacy and numeracy in Quality Assurance in agriculture

A number of Quality Assurance programs have been established in agriculture, for example Cattlecare in the beef industry and Flockcare in the sheep industry. These programs are based on the ISO 9000 series of quality standards. Producers who participate in the Quality Assurance programs must be able to understand market requirements and be able to produce to those requirements. As well, meticulous and often complex record keeping is required of primary producers. Self-paced training programs are available for those seeking Quality Assurance accreditation. The processes on which Quality Assurance procedures are based include a wide range of numeracy and literacy skills. These skills are essential for active participation in Quality Assurance in agriculture, but they have not been made explicit.

Quality Assurance involves procedures and record keeping practices relating to chemical handling, staff training, stock records, stock transaction records, livestock handling and transport, livestock chemical treatment and stock feed. These procedures require literacy and numeracy skills which will be unfamiliar to many producers.

Quality Assurance, literacy, numeracy and effective training

The effectiveness of a training program depends on matching the characteristics of the learners and the material to be learnt. The program must be delivered in a manner which suits the participants' learning styles. The program must also be matched with the purpose and expected outcomes. There is some existing research on the characteristics of farmers and their preferred delivery methods from previous ANTA funded projects (Kilpatrick, 1996 and Kilpatrick, 1997), so the outcomes of this project will also develop and add to the body of knowledge about learning styles of the rural workforce.

Project methodology

To test the definition of integrated numeracy and literacy put forward earlier in this paper the project employed a multi-site, multi-methods approach.

Data from four sources were collected and analysed:

- documents and training days which form part of the Quality Assurance training process.
- three case studies of farms which have Cattlecare Quality Assurance Accreditation. These properties were visited, and the processes, documents and equipment (such as, cattle yards and chemical storage facilities) which they used for quality assurance were observed.
- semi-structured telephone interviews with four farmers in each of four States who have attended Cattlecare training days between one and twelve months prior to the interview (sixteen interviews).
- semi-structured telephone interviews with Cattlecare trainers and a Cattlecare auditor.

The qualitative data was analysed using the NUD*IST data analysis software package. The documents were analysed according to FOG and Fleisch readability indices and a classification of lists, tables and forms by Kirsch and Mosenthal (Mosenthal & Kirsch, 1989a; 1989b; 1990a; 1990b; Kirsch & Mosenthal, 1989; 1990a; 1990b; 1990c).

The discussion about the larger project

At a point when the research project was about halfway through, the two researchers and two research assistants (both of the latter are also beef producers) had a landmark meeting. The discussion included listing the documents and texts associated with QA in the Beef industry which had to be analysed in order to ascertain what skills, knowledge and values were required to access them; and determining how to analyse the documents and texts associated with QA in the Beef industry.

What is access? (question one)

We found we had to pose the question, "What is meant by 'access'?". We referred to the existing research, as well as imagining what farmers would have

to do (skills), know (knowledge) and value (values, attitudes, feelings) in order to access quality assurance in general terms. Then we could consider what specific barriers to access lay in the printed materials associated with QA in the beef industry - in self-paced learning materials, training programmes, awareness days (orientation programmes) and the like.

So the question, "What is meant by 'access'?" became the first of the two crucial questions in this discussion. After a fulsome debate, we decided that the answer to that question was "Access has been achieved once the first [QA] audit has been completed successfully". An interesting point for further consideration is to test how this definition might be generaliseable to other areas of adult and vocational education where a more traditional view of access prevails.

Then we organised a brainstorming session around the question, "What do farmers have to be able to know (knowledge) , do (skills) and value in order to access quality assurance?", and the result looked like this:

KNOWLEDGE	SKILLS (GLOBAL AREAS)	VALUES
• knowing that QA exists	• literacy & numeracy	• value QA as important (only as a result of concern for $$$?)
• knowing about QA	• numeracy	• value top quality produce
• knowing about market forces, globalisation & change	• educational	• value change as the way to achieve goals
• knowing about agriculture / farming (how to farm)	• agricultural/farming	• recognise their own self-confidence to proceed
• knowing enough about QA to know they can do it	• book- & record-keeping	• value learning (skills, knowledge) as important
• know that risks exist	• farm mapping	
• know how to identify risks	• risk identification	
	• self-direction & management skills	

The result on the whiteboard seems unremarkable at first. We listed the columns in the sequence shown (knowledge first, skills then values) because

that is the sequence we commonly used in our discussions and found in the literature (e.g., Donaldson & Scannell, 1986). That there should be significance in the actual *sequence* in which people really engage in each of these categories of activities had not occurred to us. But it would come next, when we related these knowledge, skills and values to a discussion about priorities or stages of access to the skills, knowledge and values embodied in "quality assurance".

Chicken and egg (question two)

The second crucial question was asked when we wondered, "But what do farmers have to do/know/value *first*?" What sequence do these groups or items form when we attempt to discover what comes first? *Knowing* the importance of QA is not a sufficient condition for an engagement with further learning. Neither is being able *to do* any or all the skills listed any guarantee that learning will be engaged in. It seemed to us that it is the very last item in the last column which underpins the whole question of access, namely, that farmers have to first of all *value* learning (knowledge, skills) as important.

The more time spent reflecting on this question, the more clearly we realised that no engagement with formal learning (going to information sessions, doing a learning package) would occur unless farmers first valued the knowledge and skills associated with QA sufficiently to be prepared to engage in the next step - which is to find out more about QA and what is means for them.

What does "access" really involve?

We re-sequenced the items in the chart above, and in consultation with one farmer, deleted heavily context-dependent items, and ordered the remainder of the items to reflect factors of crucial importance in accessing QA *before* entering even information days or other more formal awareness procedures. When the chart above is re-configured to reflect the sequence of values, knowledge and skills which form an "access pathway", the significance of the discussion can be seen:

VALUES	KNOWLEDGE	SKILLS (GLOBAL AREAS)
1. value learning (skills, knowledge) as important	1. knowing that QA exists	1. skills of keeping in touch with matters beyond the farm gate
2. value change as the way to achieve goals: being prepared to accept direction from others	2. knowing about state, national and international issues, market forces, globalisation & change	2. communication / literacy skills, esp. talking, listening, observing and critically evaluating information
3. recognise their own self-confidence to proceed	3. knowledge about farming & of own enterprise	3. technical farming skills, numeracy and literacy skills

So it was posed at this middle stage of the project as a hypothetical statement that the values, knowledge and skills which are crucial for people (farmers) to access further education (about QA) are reflected in both the sequence of the columns in the table above, as well as in the sequence of items within these columns.

It became the task of the balance of the project to test this statement, refine and develop it, then ensure that any recommended awareness and learning programme takes account of these factors, both in its content and its mode of delivery.

The discussion compared with the results: A picture of the overall results in respect to numeracy and literacy

Analysis of observations of quality assurance process on the three case study farms, and examination of the Cattlecare manuals suggests that the following skills are required to access quality assurance:

- appropriate level of numeracy
- appropriate level of literacy
- book- and record-keeping
- agricultural/farming
- farm mapping
- risk identification
- self-direction and management skills
- skills of keeping in touch with matters beyond the farm gate.

The portion results which follow refer to literacy, numeracy and record keeping.

Numeracy skills

The three cases studies showed that the numeracy skills required for the non-chemical handling parts of Cattlecare are mostly counting, recording, addition, subtraction, multiplication and division. Producers need to count cattle, record stock movements on and off the farm and between paddocks, record chemical usage and add and subtract quantities of chemicals held as they are purchased and used. Chemical mixing and administration involve the more complex tasks of measuring, and interpreting and calculating mathematical ratios. The skills required roughly equate to the top level of a Year 10 mathematics course (see for example, Strasser, Phillips, & Nolan, 1995).

Readability of printed materials

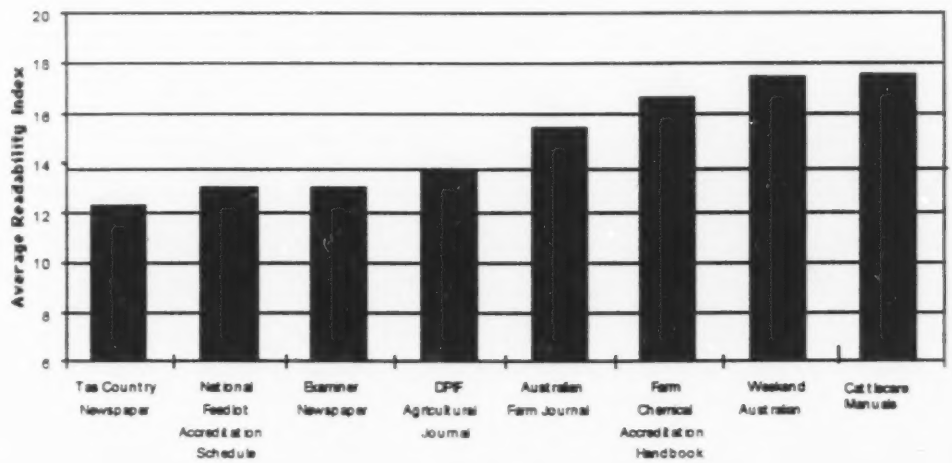
In order to access Cattlecare, farmers must be able to read, understand and apply the material presented in two manuals: *Cattlecare Code of Practice* and *Cattlecare Training Manual*. They must also have someone on the farm who

has passed the Farm Chemical Accreditation Certificate, which is a national certificate.

The project team thought it important to have some relatively objective measure of readability, but were aware of the consdierable debate, historical and on-going, about the merits of readability formulae. Instead, then, of using readability formulae categorically, it was decided to use them (a) in tandem - that is to use more than one - and (b) to use them comparatively - that is, to measure the readability of several different texts such as newspapers and then compare the Cattlecare manuals with those texts. In this way, those unfamiliar with readability test outcomes could make a judgement about the difficulty of the texts by comparing them with each other. As is always recommended in the use of readability formulae, their use should be tempered by reference to other criteria such as use of white space, layout and design and the target audience and purpose. These factors were drawn on in the larger project, but only the readability formulae results are presented here.

The results of our document analysis suggest that the Cattlecare Manuals are relatively complex. The average of FOG and Fleisch readability indices for the manuals and a range of other agricultural and popular literature is shown in Figure 1. The Cattlecare Manuals have a higher readability index that farming and popular newspapers and magazines. As well, the Farm Chemical Accreditation Handbook (required reading for the prerequisite Farm Chemical Accreditation Certificate), is more difficult to read than all the material in the chart, except the Weekend Australian Newspaper.

Figure 1: Comparative Readability of Quality Assurance Material, Farming and General Literature



Lists and tables

Another way of looking at the complexity of documents is to consider the form and complexity of the lists, tables and graphs which they contain. Mosenthal and Kirsch (Mosenthal & Kirsch, 1989a; 1989b; 1990a; 1990b; Kirsch & Mosenthal, 1989; 1990a; 1990b; 1990c) classify lists, tables and forms in order

of increasing complexity. Their work on this topic is based on research, and was evaluated by the project team as being highly suitable for adapting for the purpose used in this project. For lists and tables, their classifications are

- simple lists, such as a chemical shed inventory,
- combined lists, which consist of two simple lists, for example, a list of weight of beast and the corresponding amount of chemical to apply,
- intersecting lists, which contain three simple lists. Most have column and row headings plus other features in the table such as sub-labels, or shading, for example Figure 2, and
- nested lists, which contain four or more simple lists, for example the sample Cattlecare form in Figure 3.

Figure 2: Example of intersected list from Cattlecare training manual

ON FARM QUALITY PROBLEMS

MRL - INFRINGEMENTS - (ACTUAL EXAMPLES)

PRODUCER	RESIDUAL DETECTED	KEY FINDINGS OF TRACEBACK	PROPOSED ACTION
*	S'dimidine 0.1ppm in muscle	Farmer admitted failing to observe the WHP.	Probable infringement notice.
*	S'dimidine, S'diazine and metabolites in urine.	Sulfa product in use. No admission. Calves condemned previously.	Case under review. Will be prosecuted if possible.
*	Penicillin 0.04ppm in muscle.	Calf received 3 to 5 times correct dose. WHP observed.	Prosecution is unlikely as level detected was just below MRL. Warning letter.
*	S'diazine 3.313ppm & S'dimidine 2.61ppm in kidney.	Farmer claims that residue was due to the use of a contaminated bottle.	Levels detected very high and not consistent with trace contamination. Case under review.
*	Oxytetracycline in 2 calves at 0 2 & 0.37ppm in kidney.	Inexperienced children used product due to family illness.	Warning letter.
*	S'dimidine, S'diazine and metabolites in urine.	Children feed calves and used contaminated bucket.	Possible prosecution if residue in kidneys is >MRL
*	S'dimidine in urine.	No admission of sulfa use. Farmer's vet contacted and confirmed that farmer purchased S'dimidine containing product few days before detection.	Further interview planned. Probable prosecution.

Figure 3: Nested list from Cattlecare Code of Practice manual

PADDOCK TREATMENT RECORDS

PADDOCK USEAGE					STOCK MOVEMENT	
Date	Paddock Name/Treatment	Name/ Signed	Quarantine Period	Herd No	Date in	Date out

Figure 4 shows that the Cattlecare manuals contain a large number of more complex lists and tables. The Cattlecare Code, which serves as a template for the documentation required for Quality Assurance accreditation, has lists and tables in a form which are particularly difficult to understand.

Figure 4: Lists and tables in Cattlecare documents

Document	Simple lists	Combined lists	Intersected lists	Nested lists
Cattlecare Code of Practice Manual	17	35	-	28
Cattlecare Training Manual	32	15	6	2

Forms and record keeping

The record keeping required for quality assurance is another skill. Farmers can use any record keeping system which meets Cattlecare requirements, and the Manuals give examples of forms which satisfy these requirements.

Kirsch and Mosenthal (1990b; 1990c) classify the complexity of forms according to the form structure (a similar classification to that for lists above), source of the information to be filled in, and the response mode.

In order of increasing complexity, sources of the information to place on the form are:

- prior knowledge, usually from memory, for example the paddocks which stock were moved from and to,
- information found on the form itself, such as whether or not withholding periods have been observed on a Vendor Declaration Form,
- user needs to refer to other sources, for example a farmer checking a notebook for identification numbers of cattle treated with a drug.

Response modes, again in order of increasing complexity, are:

- identifying a single element from a list with a check mark, for example, ticking a box on a Vendor Declaration Form,
- entering elements, such as number of cattle sold or name of chemical used,
- generating an open ended response, such as recording types and locations of risks on the property, like old dip sites.

Many of the Cattlecare template forms are at the more complex end of the structure spectrum, that is integrated or nested lists. Many require information to be noted in the paddock or stockyard, then transferred later to the Cattlecare form (by hand or on computer) in the farm office. Thus, sources of information tend to also be at the more complex end of the spectrum. Most response modes are in the middle of the complexity spectrum, as they require entering elements. The form in Figure 3 is an example, where the elements to be entered are paddock name, treatment, quarantine period, herd number, etc.

Cattlecare and farmers' skills

From the readability indices and the classification of the lists and forms according to Kirsch and Mosenthal's framework for understanding documents, it appears that the Cattlecare Manuals are at the more complex end of spectrum of documents. A small number of the farmers interviewed had no problems with the training days and manuals, such as this farmer:

> Q Did you find the manual okay to use?
>
> A Yes that was fine ... I read it when I came home, ... not all of it, the things that were relevant to us, the few bits that were relevant because most of it we already do you know, we run our herd on stud lines, all our animals are numbered, they are tattooed, ...we record where they are moved... (NSW farmer 1)

However, like NSW farmer 1 most had not read all, or in most cases, any, of the manuals after the training day:

A They took us through it [the manual] step by step...

Q And have you used it since then? No, I haven't ... (NSW farmer 2)

A I probably got it [the manual] 9 months ago, but I've been fairly busy since then so I haven't done much about it... I've had a glance through it but I haven't read it properly. (Victorian farmer 1)

The farmers who had used the manual since their training day generally said that their practices already matched the Cattlecare process to a large extend, as NSW farmer 1 above. Most of those who had not used the manual, in contrast, gave examples of how adopting Cattlecare would be expensive, as did NSW farmer 2 above, or change long established practices which they believed were quite satisfactory:

> Because of necessity we will have to keep records somewhere, we probably haven't got to prove anything. But if you don't keep records of everything that you've done ... there could be a problem. (Queensland farmer 1)

> When I spray ... [contractors from a distant town] spray the whole place with the most minimal amount of MCPA and then they go, and Cattlecare say you've got to destock every paddock when you spray for 7 days. Where do you put them [the cattle]? (South Australian farmer 1)

Fenwick and Weatherhead (1994) found that 66% of farmers surveyed could interpret a *Round Up* label and calculate the correct amount needed for a 400 litre handgun, but only 10% could work out how much drench to buy for their herd from the information on the drench label.

Few of the farmers interviewed had Farm Chemical Accreditation Certificates, or had definite plans to attend a Farm Chemical Accreditation course:

> Two of us have got to go off and do a chemical course. ... its going to cost me and it's pushing me so far up against the wall when I've got my back to the wall anyway, and I'm one of the top people. (NSW farmer 3)

When the numeracy skills needed for correct use of chemicals are also considered, alongside the information which we have about the range of farmers' literacy and numeracy skills it is clear that for some farmers, like the one quoted below, access to Cattlecare depends on some upskilling.

> The way the chaps spoke that day [awareness day] ... it just seemed too complicated really for the average person to take on. (Queensland farmer 1)

Knowledge

The case studies and interviews with trainers and the auditor gave us the following list of knowledge required to access Quality Assurance:

- knowing that QA exists and how to find out more about it
- knowing about market forces, globalisation and change

- knowledge about farming and of own enterprise
- know how to identify risks.

All those interviewed had attended a quality assurance awareness or training day, so all were aware of quality assurance, and had found out more about it through the awareness or training day.

Most made some statements that suggested they were aware of the forces behind quality assurance. There was a general consensus that quality assurance was inevitable, and that they would eventually have to be audited. Most explained with reasons that related directly to their own farm business:

> I've got no choice because the people I'm buying my bulls for are insisting on it. (Queensland farmer 1)

Only a few farmers gave "global", or "big picture" reasons to explain why they would have to become quality assurance accredited:

> We felt there was a need for something like this to keep a check on it because the industry is just in turmoil really, so if enough people get involved in this it will straighten a lot of that ... it will help us with the marketing of our product. (Victorian farmer 3)

Most farmers could identify some changes which they would have to make to their practice or their farm, for example changes to yards or isolating dip sites:

> I've done a few of the lead up things such as the identifying all my cattle... probably 3/4 of those that have come through the yards I've tagged them with an identification number. (NSW farmer 4)

> People went home and looked at their yards or looked at their chemical storage or looked at the facilities they had and started adding up the pennies... (South Australian farmer 4)

The vast majority of the farmers interviewed could estimate the cost of the changes they would have to make to become Cattlecare accredited, and the cost of the auditor's time and travel to their property. These farmers identified the cost of Cattlecare and the low prices they are receiving as the reason they had not taken any further steps toward Cattlecare accreditation after their training or awareness day:

> ... having this place audited, that's going to be a large expense for me and at this stage it's a game, because cattle prices are at an all time low. We would have to put a new bale in for containing the bulls head and that's $900, we've got to do a bit of fencing around old areas that have been used as sheep yards... (NSW farmer 2)

Skills, knowledge and values

The discussion of skills and knowledge above suggests two possible reasons for failure to proceed with quality assurance: (i) the relatively high level of literacy and numeracy skills required, and (ii) the high cost of necessary changes and accreditation, particularly in a time of depressed prices. At first glance, it may seem that the farmers interviewed who attended the quality assurance days and

have their Cattlecare Manuals, haven't gone any further for one or both of these reasons. However, to do so would ignore the issue of values.

Strong Cattlecare-fostering and Cattlecare-inhibiting values emerged from the data analysis. Many of the inhibiting values related to attitudes to industry directions. Roughly three quarters of those interviewed expressed Cattlecare-inhibiting values, such as this:

> It's hitting us at the far end rather than at the end product. Once it goes through the abattoirs we lose absolute control of it. My cattle ... would probably be top grade, but you get bugger all recognition for anything like that. Once it goes through the abattoirs its just one piece of meat. (Queensland farmer 2)

> We are going so wrong in the beef industry. We have got these stupid advertisements on the television saying eat lean beef and anyone would know that lean beef was so tough. (Queensland farmer 4)

These values contrast with those a small number of farmers who expressed Cattlecare-fostering values. Most fostering values related to the "bigger picture" and changing practices so as to market to consumer requirements, like these farmers:

> ...they've [farmers with negative attitudes to Cattlecare] have got to think a bit wider because it's going to come... you're accessing your own markets more or less now. (Victorian farmer 2)

> It's something that's been lacking for a long long time...we're hopelessly behind; it's absolutely disgusting what passes for quality beef to the retail outlets. (South Australian farmer 4)

By bringing together data from the case studies and farmer interviews, we identified the following values as required for accessing quality assurance:

- value learning (skills, knowledge) as important
- value change as the way to achieve goals: being prepared to accept direction from others, such as industry leaders
- recognise their own self-confidence to proceed.

Which comes first, skills knowledge or values?

What do farmers have to do (skills)/know (knowledge)/value *first* in the access process? Being able *to do* any or all of the required skills, such as reading and understanding manuals, and mixing chemicals correctly, is no guarantee that the learning necessary to proceed with quality assurance will occur. Neither is *knowing* the importance of QA a sufficient condition for an engagement with further learning for QA.

Analysis of the data shows that most of those who expressed Cattlecare fostering values had taken some steps toward quality assurance, while those who expressed inhibiting values had not. For example, NSW farmer 4, quoted above, who had started to tag cattle, expressed Cattlecare fostering values. Queensland farmers 2 and 4, also quoted above, have made no plans to take any of the steps necessary to proceed with Cattlecare.

It seems that the thing which underpins the whole question of access is that farmers have to first of all *value* learning (skills, knowledge) as important. Only then will they move on to learning and so to acquiring the skills and knowledge which they need.

Some implications: What is "learning"

As the study established, our traditional notions of learning need to be revisited. The prerequisite to any kind of formal learning was confirmed to be an orientation stage, when the farmers need to first of all accept that change was a process they needed to engage with, and then that Quality Assurance had something that they wanted and needed. The first step in "the learning process" was therefore *to accept the need to learn*.

Now this seems quite unextraordinary to the more traditional literacy and numeracy educators - those who have for many years argued for the central role of self-confidence in the learning process - without this self-confidence, it is argued, the learners will not progress.

The problem with the term "self-confidence" is that it is so hard to get hold of, to define and then to quantify for accountability and reporting purposes. The last few decades of increased funding to adult literacy and numeracy programs have shown the importance of being able to clearly and precisely say what it is that adult literacy and numeracy educators have achieved.

We believe that, in this project, we can show that the development of self-confidence is demonstrable as the "orientation" phase of learning, where learners are led to accept the need to go on with their learning. In other words, the values that this research shows as necessarily preceding any other aspect of the learning process equate with the development of self-confidence.

The chief task now is to tackle the thorny problem of "teaching values". What is also clear from the project is that learning new values is the same process as becoming encultured into a new set of values, and there is an established body of research literature on the nature of learning as acquiring the values of a new "culture". In the most significant ways possible, learning is the process of gaining self-confidence in oneself as a learner through recognising that new values are valuable for oneself, of recognising the value of assuming those values for one's own benefit, and *then*, and only then, being able to master the linguistic and numeric features of those new value-systems in order to function within them.

QA for beef farmers presents a range of elements which are different forms of valuing, knowing and doing. In this sense, the nonformal learning process identified in this project is very much a process of moving from one set of cultural values to another.

Summary and conclusion

What is significant is that the term "access" (and its presently favoured vocational education and training cousin, "participation") is often used glibly, and as if all we need to do is provide formal and nonformal exposure to skills, knowledge and values acquisition. It is clear that "nonformal learning" in value-formation *before* any "formal learning" occurs is crucial to ensure later access to more formal kinds of education and training. It is also apparent that certain knowledges - "knowledge that" and "knowledge how" - form a group of necessary pre-requisites for further learning opportunities to be accessed.

Another finding is that numeracy and literacy practices could not be disembedded from each other, nor from the task of which they are a part. That is, it is not possible to say "This is a numeracy task", or "This is a literacy task", or that one or the other should be learned first or not at all. When the complex nature of the various documents required for understanding and monitoring QA are analysed, it is not possible to indicate one aspect in this process whose importance seems greater than another: Understanding the way the forms were set out, the reading of words and numbers within the forms, the tasks of writing words and numbers in various parts of the forms - all these are required to be executed in particular real-life contexts (cattle yards, farm kitchens, in tractors, with colleagues, business partners, employees) and not in formal training rooms or from training packages. The task-embeddedness of the contributing skills is fully evident in the analyses reported here.

Neither were numerical and literacy activities *prerequisites* for learning about QA. Prerequisites for moving further on into the learning process were the farmers' willingness to accept that change was necessary to them in their personal circumstances at that particular time. Another prerequisite for learning is the farmers' need to orient themselves to Quality Assurance, and it is at this point that numerical and literacy skills are shown to be crucial in facilitating the more formal acquisition of the knowledge and skills which lead to accreditation in QA.

Perhaps most importantly of all, the reflections demonstrate the gross assumptions many of us have tended to make about the importance of "formal learning", since it is suggested here that the most important part of learning occurs before the "formal" stage in nonformal yet identifiable and categorical ways. Of the three traditional features of learning: skills, knowledge and values, it has been shown that values come first, an orientation of learners to the need for change, then comes the subject of the learning (in this case QA). Values are an absolute prerequisite to access and participation in further learning processes.

The development of self-confidence is shown in the "values" stage of learning, where "orientation" to the task is required. Learners at these early stages are led to accept the need to go on with their learning. In other words, the values that this research shows as necessarily preceding any other aspect of the learning process equate with the development of what adult literacy and numeracy teachers have termed "self-confidence". The accountability required in the adult literacy and numeracy teaching profession these days is such that

the results of this project may assist in framing real (not "warm and fuzzy") outcomes for the orientation phase of learning - outcomes the field has been attempting to formalise for many years, yet about which they keep being told "But that's not about learning literacy and numeracy - that's a retention problem" - and so gets relegated to an administrative rather than educational function. Or is simply ignored.

In the case of this project, the researchers found that some 75% of beef producers were avoiding "coming to grips" with change and further education about QA. Initial orientation to learning, accepting the need for personal and family change, being prepared to "give learning a go" as a solution to a problem rather than as creating a new one - these are the "content areas" of the early stages of a re-thought learning process. Unless this point is enshrined in policy and funding applications, we will continue to automatically "block out" - prohibit from access and participation - a huge proportion of the training market in any single industry.

References

Ashton, D., Martin, P., Rudwick, V. & Barrett, D. (1996) *The Australian Beef Industry, 1996*. ABARE, Canberra.

DEET (1991) *Australia's Language: The Australian Language and Literacy Policy* . AGPS, Canberra.

Donaldson, L. & Scannell,, E., (1986). *Human resource development: The new trainer's guide. Second Edition.* Sydney: Addison-Wesley.

Falk, I. (1995) A reconceptualisation of learning: Why put critical literacy into practice? *Critical Forum: International Journal of Adult Literacies and Learning, (3)*2 & 3, pp. 64-81.

Falk, I. (1997) Discourse, knowledge and education: Learning as the discursive reassembly of cultural practice. *Critical Forum: International Journal of Adult Literacies and Learning, (5)*1.

Fenwick, J. & Weatherhead, J. (1994) *Competency in Communication: Survey Report*. Warragul: Distance Learning Centre, Victorian College of Agriculture and Horticulture.

Foundation Studies Training Division (1994) *Integrating English Language, Literacy and Numeracy into Vocational Education and Training: A Framework*, DEET: NSW TAFE Commission.

Freebody, P., Cumming, J. & Falk, I. (1993). *A Trialing and Evaluation of the Adult Literacy and Numeracy (ALAN) Scales.* DEET: Canberra.

Gee, J. (1990). *Social linguistics and literacies.* UK: The Falmer Press.

Kilpatrick, S. (1997) *Effectiveness of delivery methodologies for education and training to rural Australia*. Tasmanian Rural Industry Training Board.

Kilpatrick, S. (1996) *Change, Training and Farm Profitability*.. National Farmers' Federation, Canberra.

Kirsch, I. & Mosenthal, P. (1989) Understanding Documents: Building Documents by Combining Simple Lists. *Journal of Reading*. 33, 2, 132-135.

Kirsch, I. & Mosenthal, P. (1990a) Understanding Documents: Nested Lists. *Journal of Reading*. 33, 4, 294-297.

Kirsch, I. & Mosenthal, P. (1990b) Understanding Documents: Understanding Forms, Part I. *Journal of Reading*. 33, 7, 542-545.

Kirsch, I. & Mosenthal, P. (1990c) Understanding Documents: Understanding Forms, Part II. *Journal of Reading*. 33, 8, 636-641.

Martin, P. (1996) The Structure and Performance of Australian Agriculture. Paper delivered at the 22nd National Conference of the Australian Farm Management Society, Launceston 20-22 March.

Mosenthal, P. & Kirsch, I. (1989a) Understanding Documents: Lists: The Building Blocks of Documents. *Journal of Reading*. 33, 1, 58-60.

Mosenthal, P. & Kirsch, I. (1989b) Understanding Documents: Intersecting Lists. *Journal of Reading*. 33, 3, 210-213.

Mosenthal, P. & Kirsch, I. (1990a) Understanding Documents: Understanding Graphs and Charts, Part I. *Journal of Reading*. 33, 5, 371-373.

Mosenthal, P. & Kirsch, I. (1990b) Understanding Documents: Understanding Graphs and Charts, Part II. *Journal of Reading*. 33, 6, 454-457.

National Farmers' Federation (1993) *New Horizons: A Strategy for Australia's Agrifood Industries*. National Farmers' Federation, Canberra.

Strasser, D., Phillips, G. & Nolan, J. (1995) Heinemann mathematics 10. Port Melbourne: Rigby Heinemann.

Queensland Numeracy and Literacy Strategy (1994) TAFETEQ DEVETIR: Queensland.

Tasmania Development and Resources (1995) Commonwealth and State Programs: Initiatives on Quality Assurance. Marketing and Business Service, Agribusiness Division. Unpublished paper.

Tasmanian Farmers and Graziers Federation (1996) Personal correspondence.

Numeracy, Literacy, Self-confidence and Values: Chickens, eggs and 'access' *Ian Falk & Sue Kilpatrick* DI/1998

Centre for Research & Learning in Regional Australia

PO Box 1214
Launceston
Tasmania 7250
Australia
Tel: (03) 6324 3142
Fax: (03) 6324 3040
E-mail: Lamanda.Harris@utas.edu.au